THE RELATIONSHIP AMONG BODY COMPOSITION, MAXIMAL OXYGEN UPTAKE, SPRINT ABILITY AND T-DRILL AGILITY TESTS IN FIRST DIVISION BASKETBALL PLAYERS

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ABSTRACT

Objective: The purpose of the present study was to investigate the relationship among body composition, maximal oxygen uptake (VO_{2max}), sprint ability, and agility test in first division basketball players.

Material and Methods: 22 first division male basketball players participated in this study voluntarily (age: 24.0 ± 3.81yrs; height: 197.9 ±8.1 cm; body weight: 98.4± 12.3kg). Body weight and percentage body fat (PBF) were used for the determination of body composition (Tanita BC-418, Japan). Multi-stage 20-m shuttle run test was used for the determination of estimate maximal oxygen uptake, sprint-ability of the basketball players was determined by 10-30 meter single-sprint and T-drill test times were used for the determination of agility (Newtest Powertimer, Finland).

Results: Results of Pearson Product Moment correlation analysis indicated significant correlation between body weight with 10 meter sprint times ($r=0.560$; $p<0.01$), 30 meter sprint times ($r=0.543$; $p<0.01$), VO_{2max} ($r=-0.684$; $p<0.01$), T- drill test times ($r=0.569$; $p<0.01$). Similarly PBF was significantly correlated with 10 meter sprint times ($r=0.604$; $p<0.01$), 30 meter sprint times ($r=0.513$; $p<0.05$), VO_{2max} ($r=-0.508$; $p<0.05$). In addition, T- drill test times was found to be significantly correlated with 30 meter sprint times ($r=0.475$; $p<0.05$). Similarly VO_{2max} was significantly correlated with 10 meter sprint times ($r=-0.487$; $p<0.05$), 30 meter sprint times ($r=-0.565$; $p<0.05$).

Conclusion: As a conclusion, the findings of the present study indicated significant correlation among body composition, VO_{2max}, sprint ability and agility test performance in basketball players.

Keywords: Body composition, maximal oxygen uptake, sprint ability, agility, basketball

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Introduction

Basketball may be considered a predominantly anaerobic exercise that requires participants to repeatedly perform short sprints over the duration of a basketball match (Castagna et al., 2009). However some studies have supported this assumption, showing that basketball performance, considered seasonal playing time, is not affected by aerobic endurance (Hoffmann et al., 1996). In addition to Ostojic et al., (2006) showed that body composition, endurance, balance between anaerobic power and aerobic power are of primary importance in evaluating elite basketball players.

Objective: The purpose of the present study was to investigate the relationship among body composition, maximal oxygen uptake (VO_{2max}), sprint ability, and agility test in first division basketball players.

Material and Methods:

Subjects: 22 Turkish first division in male basketball players participated in this study voluntarily (age: 24.0 ± 3.81yrs; height: 197.9 ±8.1 cm; body weight: 98.4± 12.3kg). The subjects were fully informed about the procedures to be used and the experimental risk. Written informed consent was obtained from all the subjects.

Procedure

Anthropometric Measurements

Subjects reported to the laboratory at 8:00 AM. On entering the laboratory, height (m), body mass (kg), and percentage of body fat (PBF) were measured in each subject. The height of the basketball players was measured using a stadiometer accurate to within 1 cm (SECA, Germany), while electronic scales (Tanita BC 418, Japon) accurate to within 0.1 kg were used to measure their body mass and body fat percentages (Lohman ve ark., 1988). Body weight and percentage body fat were used for the determination of body composition.

Multi-Stage 20-M Shuttle Run Test

Subjects' maximal oxygen uptake (VO_{2max}) was indirectly obtained using a multi-stage 20-m shuttle run test .Briefly, this consisted of shuttle running between two parallel lines set 20 m apart, running speed cues being indicated by signals emitted from a commercially available pre-recorded audiocassette tape. The audiocassette tape dictated that subjects started running at an initial speed of 8.5 $km.s^{-1}$ and that running speed increased by 0.5 $km.s^{-1}$each minute. This increase in running speed is described as a change in test level. The speed of the cassette player was checked for accuracy in accordance with the manufacturer's instructions before each application. All subjects performed a 10 min warm up that included prescribed jogging and stretching. Test results for each subject were expressed as a predicted VO_{2max} obtained by cross-referencing the final level and shuttle number (completed) at which the subject volitionally exhausted with that of the VO_{2max} table provided in the instruction booklet accompanying the multi-

stage 20-m shuttle run test. Only fully completed 20 m shuttle runs were considered.

10-30 m. Sprint Tests

Sprint-ability of the basketball players was determined by 10-30 meter single-sprint tests The subjects performed 2 maximal 30-m sprints (with 10-m split times also recorded) on the basketball court. During the recovery period between 30-m sprints (3 minutes). Prior to each sprint test, players performed a thorough warm-up consisting of 10 minutes of jogging at 60–70% of HRmax and then 5 minutes of exercise involving fast leg movements (e.g., skipping, cariocas) over short distances of 5 to 10 m and 3–5 single 15-m shuttle sprints with 2 minutes of passive recovery. Time was measured using an electronic timing system (Newtest Powertimer, Finland).

T Drill Agility Test:

T-drill test times of the basketball players were used for the determination of agility. This test was administered using the protocol outlined by Semenick (1990). Four 22.86 cm (nine inch) collapsible agility cones were arranged as shown in Figure 1. At the tester's signal, the subject sprinted forward 9.14 M (10 yards) and touched the tip of the cone (B) with their right hand. Then they performed a lateral shuffle to the left 4.57 m (five yards) and touched the tip of the cone (C) with the left hand. Subjects then continued to shuffle 9.14 m (10 yards) to the right and touched the tip of the cone (D) with their right hand. They then shuffled 4.57 m (five yards) to the left and touched point B with their left hand. Finally, subjects back peddled 9.14 m (10 yards), passing through the finish at point A (Patterson et al. 2008). Time was measured using an electronic timing system (Newtest Powertimer, Finland).

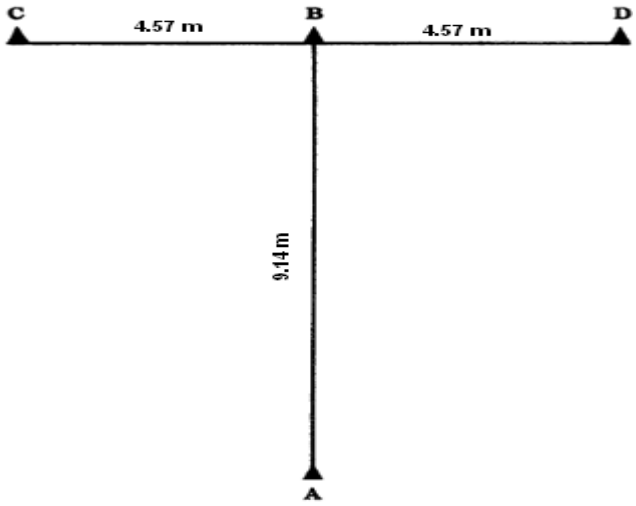

Figure 1: T Drill Agility Test

Statistical Analyses

All statistical analyses were carried out using SPSS Statistical Analysis Software (SPSS Version 15.0 for Windows, SPSS Inc., Chicago, Illinois, USA). First of all the mean and SD were calculated for each variable. Then the relationship among body composition, maximal oxygen uptake (VO_{2max}), sprint ability, and agility test in first division basketball players was detected by Pearson's product moment correlation. The level of statistical significance was set at $p \leq 0.05$.

Results

The participants' physical and physiological data are set out in Table 1.

Table 1: Basketball Players' physical and physiological features

Variable	Mean	Std. Deviation
Age (yrs)	24.00	3.81
Body Height (cm)	197.90	8.10
Body Weight (kg)	98.40	12.30
Percentage of Body Fat (%)	10.85	5.22
10 Meter Sprint (sec)	1.78	0.08
30 Meter Sprint (sec)	4.36	0.21
T Drill Agility (sec)	9.49	0.61
VO_{2maks} ($ml.kg^{-1}.min.^{-1}$)	42.52	8.59

Results of pearson product moment correlation analysis indicated significant correlation between body weight with 10 meter sprint times ($r=0.560$; $p<0.01$), 30 meter sprint times ($r=0.543$; $p<0.01$), VO_{2max} ($r=-0.684$; $p<0.01$), T- drill test times ($r=0.569$; $p<0.01$). Similarly PBF was significantly correlated with 10 meter sprint times ($r=0.604$; $p<0.01$), 30 meter sprint times ($r=0.513$; $p<0.05$), VO_{2max} ($r=-0.508$; $p<0.05$). In addition, T- drill test times was found to be significantly correlated with 30 meter sprint times ($r=0.475$; $p<0.05$). Similarly VO_{2max} was significantly correlated with 10 meter sprint times ($r=-0.487$; $p<0.05$), 30 meter sprint times ($r=-0.565$; $p<0.05$).

Conclusion: As a conclusion, the findings of the present study indicated significant correlation among body composition, VO_{2max}, sprint ability and agility test performance in basketball players.

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